Bureau of Water

South Carolina Department of Health and Environmental Control

South Carolina Water Use Report

2001 Summary

September 2003

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South Carolina Department of Health and Environmental Control
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Forward

The South Carolina Department of Health and Environmental Control (DHEC) is committed to the responsible management of South Carolina's water resources by encouraging continued conservation and reasonable use to ensure a sustainable supply for present and future demands. The South Carolina Surface Water Withdrawal and Reporting Act, 49-4-10 et. seq., and the South Carolina Groundwater Use and Reporting Act, 49-5-10 et. seq., require water users that withdraw three (3) million gallons or greater in any month to register with and report that use annually to DHEC.

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Introduction

For generations, South Carolinians have considered the available fresh water supply as clean, abundant, easily attainable and, for all practical purposes, inexhaustible. Today, close to 1.2 million people rely on groundwater and 2.8 million people rely on surface water for their drinking water and other uses in South Carolina. Continued development in the state has placed increasing demand on water supplies. During 2001, South Carolina was experiencing a fourth consecutive year of deficient rainfall, which placed extreme pressure on groundwater systems and surface water bodies across the State. With limited and sporadic rainfall events, groundwater systems and surface water bodies under continuous natural discharge and human use (pumpage) showed steady and, at times, drastic water level declines with numerous waterways reaching record low flow conditions. Due to the low flow conditions, excursions of saltwater inland along coastal waterways threatened some surface water intakes. Some homeowners relying on shallow water wells were forced to drill deeper wells or seek alternate sources of water supply.

In conjunction with natural conditions, the continued impact to groundwater systems through human induced contamination (physical and chemical) or natural impact demonstrate the vulnerability of this finite resource and the continuing need to closely monitor, manage and preserve the resource in South Carolina for current and future generations. The state General Assembly declared that the groundwater resources of the State be put to beneficial use to the fullest extent to which they are capable and to provide and maintain conditions which are conducive to the development and use of (all) water resources.

Consistent and accurate data collection is requisite in establishing water use trends and implementing reasonable management strategies. Water use reporting outside of designated Capacity Use Areas has been historically voluntary. As of January 1, 2001, anyone withdrawing groundwater or surface water in excess of three (3) million gallons per month (in any month) must register and report that use annually to the South Carolina Department of Health and Environmental Control (Department). Registration and reporting is now a requirement of law and the Department has authority to take enforcement action against those not reporting.

Purpose and Methodology

The purpose of the *South Carolina Water Use Report* is to summarily present reported water use in South Carolina by county and use category during calendar year 2001. Water use data were collected by annual reporting of water use by permitted and registered users. Water use is reported in **million gallons** per month. The Department maintains the water use databases utilized in this report.

Terminology

Aquifer – A geologic formation, group of formations, or part of a formation that contains sufficient saturated permeable material to yield significant quantities of water to wells and springs.

Aquaculture water use (water use category) – Water used for raising, farming and/or harvesting of organisms that live in water, such as fish, shrimp and other shellfish and vegetal matter (seaweed).

Consumptive water use – The amount of water withdrawn that is evaporated, transpired, incorporated into products or crops, consumed by humans or livestock, or otherwise removed from the immediate water environment.

Effluent (wastewater) – Water conveyed out of a wastewater treatment facility or other works used for the purpose of treating, stabilizing, or holding wastewater.

Evapotranspiration – Collective term, including water discharged to the atmosphere as a result of evaporation from the soil and surface-water bodies and plant transpiration.

Farm – Any operation from which $1000.00 or more of agricultural products were sold or normally would be sold during the year.

Golf course irrigation (water use category) – Water applied to maintain golf course turf, including tee boxes, fairways, putting greens, associated practice areas and periphery aesthetic landscaping.

Groundwater – Generally, all subsurface water as distinct from surface water; specifically, that part of the subsurface water in the saturated zone.

Hydroelectric water use (water use category) – Water used in generating electricity where turbine generators are driven by falling water.

Industrial water use (water use category) – Water used for commercial and industrial purposes, including fabrication, processing, washing, in-plant conveyance and cooling.

Irrigated acreage – Acreage capable of being irrigated, with regard to availability of water, suitable soils and topography of land.

Irrigation water use (water use category) – Water that is used for agricultural and landscaping purposes including turf farming and livestock management.

Other use (water use category) – Any use of surface water or groundwater not specifically identified in any of the other categories.

Reclaimed water – Wastewater treatment plant effluent that has been diverted, intercepted, or otherwise conveyed for use before it reaches a natural waterway or aquifer.

Surface water – Water flowing or stored on the earth's surface such as a stream, lake, or reservoir.

Thermoelectric water use (water use category) – Water used in generating electricity from fossil fuel (coal, oil, natural gas), geothermal, biomass, solid waste, or nuclear energy.

Water supply (water use category) – Water withdrawn by public and private water suppliers and conveyed to users or groups of users. Water suppliers provide water for a variety of uses including domestic, commercial, industrial and public water use.

Water usage rates – As utilized in this report, measurements to quantitatively represent withdrawal over time; as in gallons per minute (gpm), gallons per day (gpd) and gallons per year (gpy).

Water use – Generally, water that is used for a specific purpose (i.e., domestic use, industrial, etc.). Broadly, human interaction with and influence on the hydrologic cycle, and includes water withdrawal, distribution, consumptive use, wastewater collection and return flow.

Withdrawal – The removal of surface water or groundwater from the natural hydrological system for use, including, but not limited to, water supply, industrial use, commercial use, domestic use, irrigation, livestock, power generation.

South Carolina Climate

The climate of South Carolina is classified as humid subtropical except in the Blue Ridge physiographic province, where it is humid continental. Average temperature varies from the mid-50's in the mountains to low-60's along the coast. The average annual precipitation is approximately 48 inches, with an annual total in the mountains of 70 to 80 inches, an annual total in the Midlands of 42 to 47 inches and an annual total along the coast of 50 to 52 inches. Measurable snowfall is rare, occurring one to three times a year with accumulations seldom remaining more than a day or two. Since 1900 severe droughts have occurred statewide in 1925, 1933, 1954, 1977, 1983, 1986, 1990 and 1993 or approximately every eight (8) years. Until the present drought condition, the most severe drought occurred in 1986. Figure 1 presents precipitation data for the years 1997 through 2000.
(Climate data interpreted from the South Carolina Department of Natural Resources, State Climatologist)

South Carolina Precipitation Data
1997 – 2000

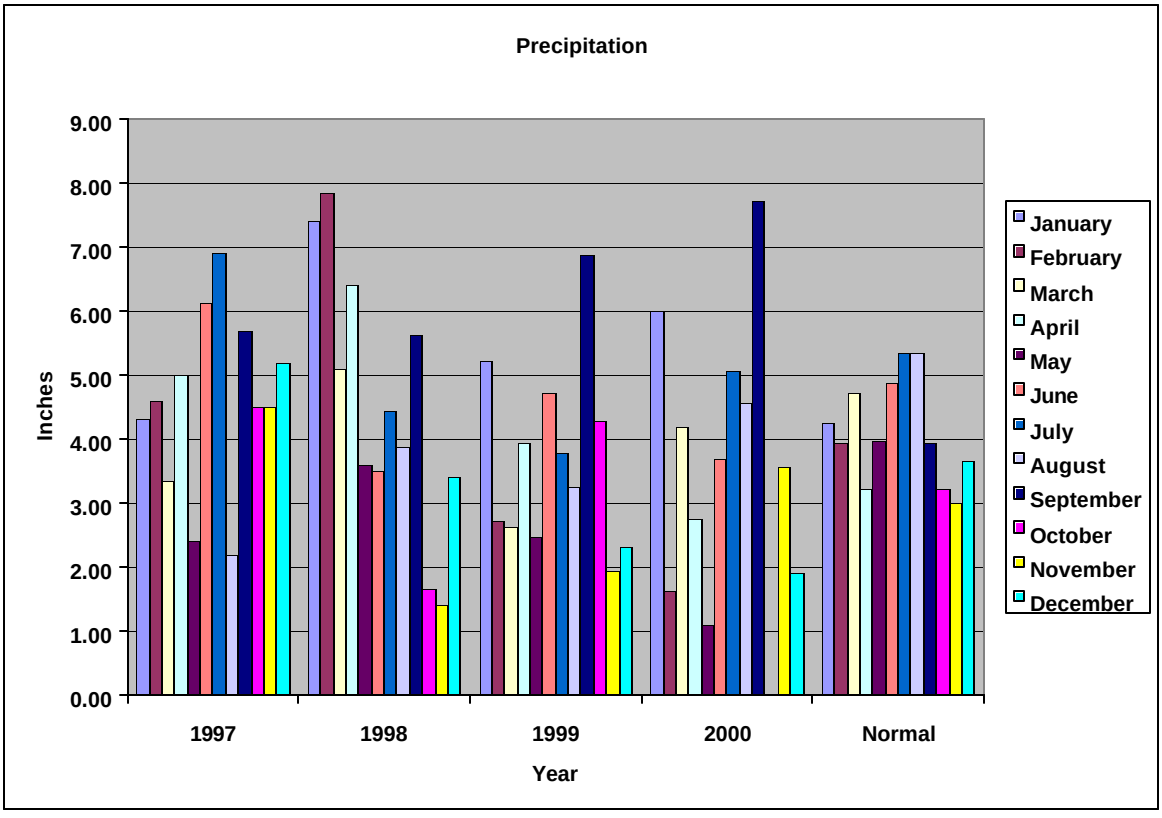

Figure 1 (adapted from National Oceanic and Atmospheric Administration, South Carolina Climate Summary)

South Carolina Geography and Hydrogeology

South Carolina has a varied and diverse ecological and natural beauty covering a total of 31,189 square miles, with approximately 30,111 square miles land area and approximately 1,078 square miles inland or coastal waterways. The diversity we experience is resultant of climatic conditions, geology and three major physiographic regions: the Blue Ridge, the Piedmont and the Coastal Plain (Figure 2). The physiographic regions exhibit variations in topography, geology, hydrology and vegetation that directly affect the quantity, quality and availability of water resources in South Carolina. The geology of South Carolina is generally characterized as crystalline rocks of the Blue Ridge and Piedmont physiographic regions and unconsolidated sediments of the Coastal Plain (Figure 3).

Blue Ridge

The Blue Ridge physiographic province is located in the extreme northwest portion of Oconee and Pickens counties (Figure 2). Hydrogeology of the Blue Ridge is characterized by clayey to sandy saprolite, ranging in depth from several feet to tens of feet, overlying crystalline rock. The saprolite typically exhibits high porosity and low permeability resultant from relatively high clay content. The saprolite generally grades downward through a highly permeable transition zone to unaltered parent bedrock. Groundwater conditions of the bedrock are dependent on the number of fractures and degree of interconnection of the fracture systems. Groundwater moves slowly through the saprolite and discharges to surface water bodies, wells, or is released from storage to the underlying bedrock through fractures. Differences in lithology of parent material and degrees of metamorphism and tectonic histories directly affect the hydraulic properties and characteristics of both units.

Piedmont

The Piedmont physiographic province includes all counties, or portions of counties, northwest of and to the Fall Line (Figure 2). Hydrogeology of the Piedmont is developed similarly to that of the Blue Ridge, but the diminished relief allows for greater saprolite development.

Coastal Plain

The Coastal Plain physiographic province includes all counties, or portions of counties, extending from the *Fall Line* east of and to the Atlantic Ocean (Figure 2). Hydrogeology of the Coastal Plain is characterized by aquifers developed in layers of sands and silts or high-permeability limestone confined by units of clay and silts or low-permeability limestone. The hydraulic characteristics of the Coastal Plain aquifers are determined by composition, thickness, areal extent and relative distance from the outcrop location. A generalized cross-section for the Coastal Plain aquifers is presented as Figure 4.

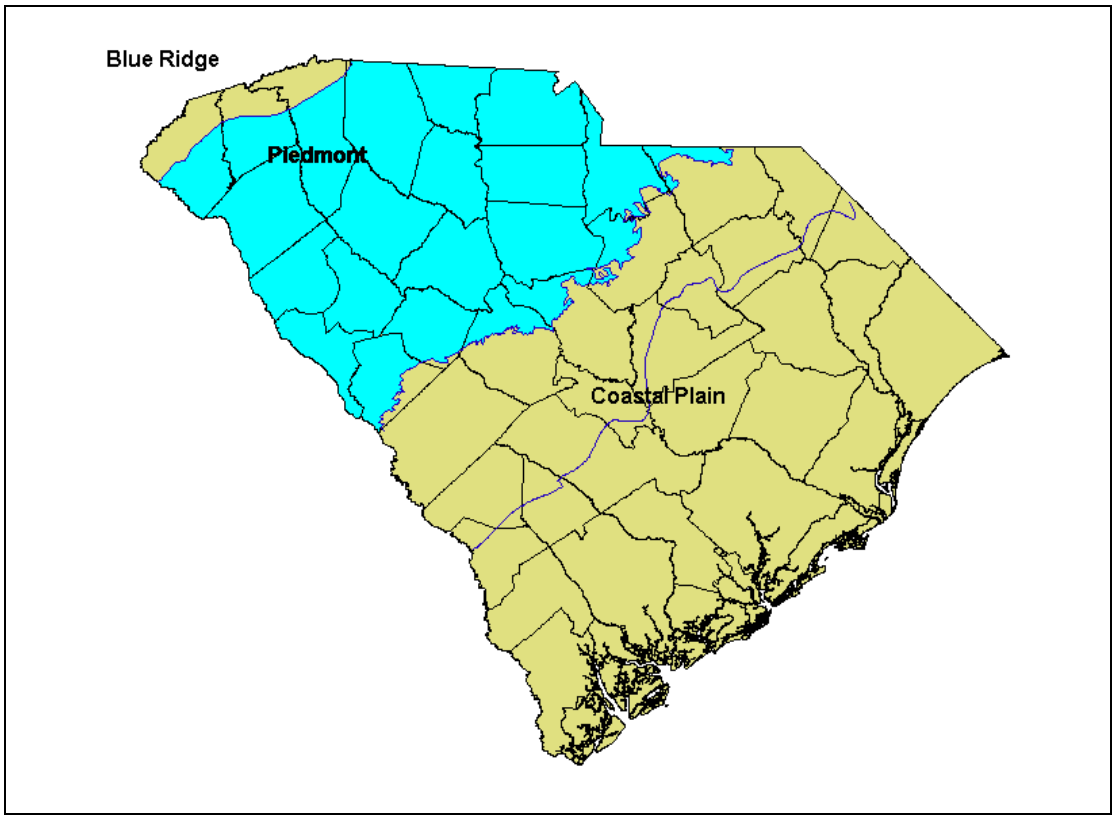

Figure 2 South Carolina Physiographic Provinces

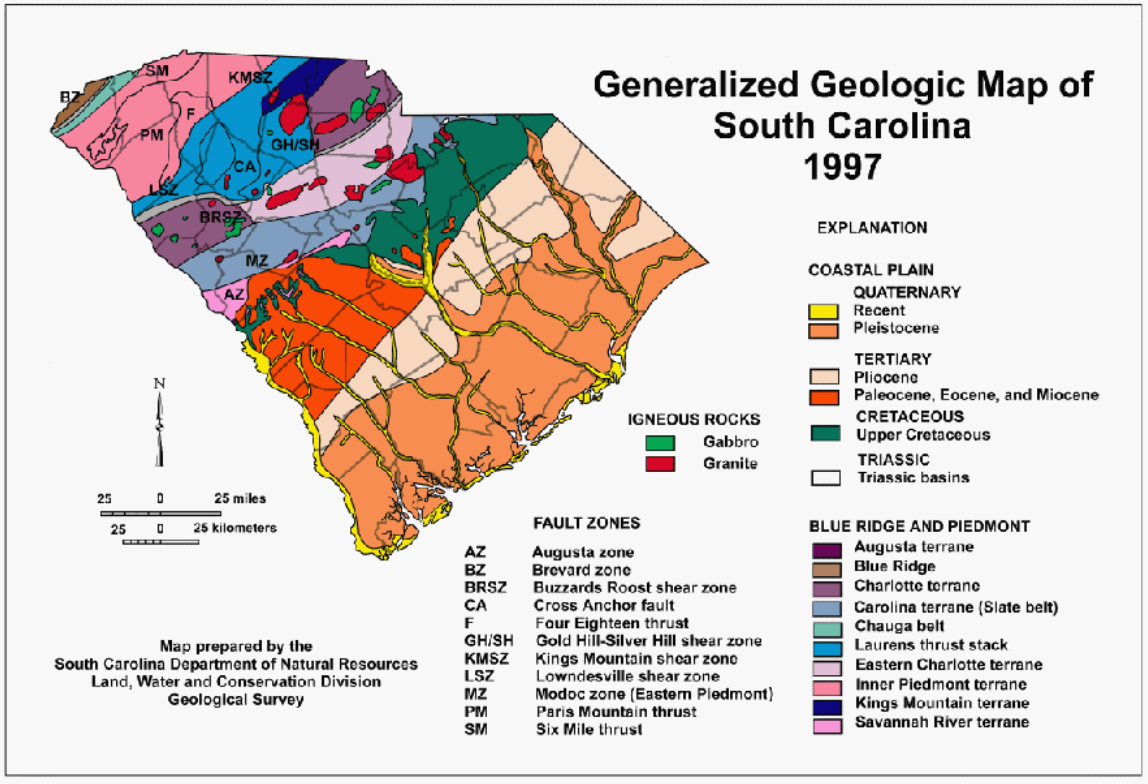

Figure 3 South Carolina Geology

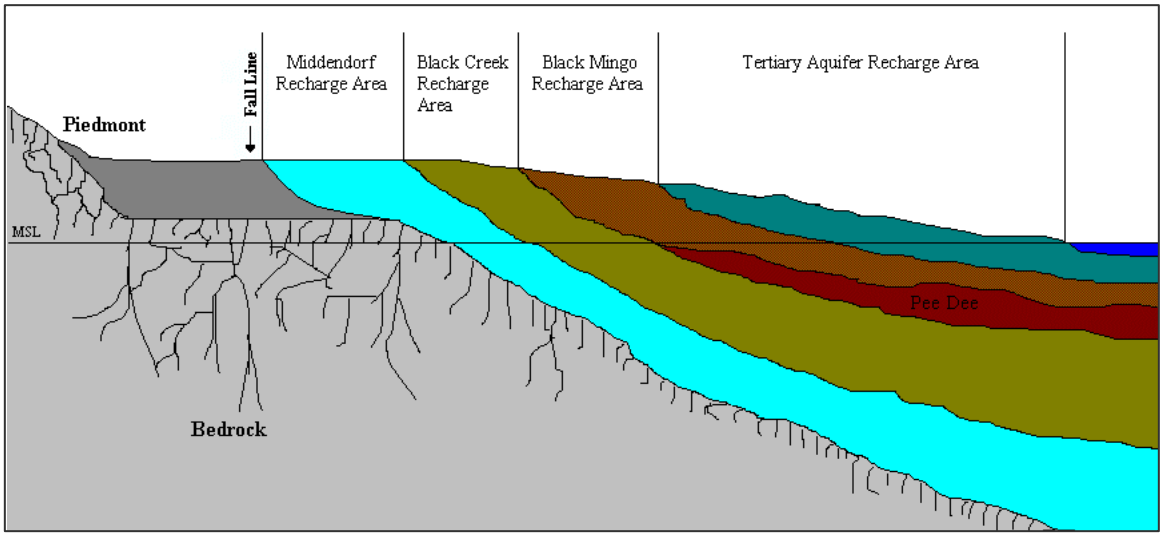

Figure 4 Generalized Cross-Section

Demographics

According to the 2000 Census, South Carolina's estimated population is 4,012,012. Approximately 54.6% of the population resides in an urban setting and approximately 45.4% reside in rural communities. South Carolina has approximately 25,000 farms, occupying 4,588,000 acres (7,170 square miles). Of this, approximately 2,500,000 acres (3,905 square miles) are cropland [(1)]. Major manufacturing industries are located along the I-26/I-85 corridor, specifically in the Greenville-Spartanburg Metropolitan Statistical Area (MSA), Columbia MSA, Charlotte-Gastonia-Rock Hill MSA and Charleston MSA. Other manufacturing concentrations are located in the Augusta-Aiken MSA, and the Florence area [(2)]. South Carolina is served by 47 electric utilities and nine (9) generating utility companies with 51 power plants (206 generators) with a total rating capacity of 18,827.4 megawatts. Power production in the State (2000) totaled 90,079 million kilowatt hours [(3)].

(Source: (1) 1997 Census of Agriculture, Volume 1 Geographic Area Series, "Table 1. County Summary Highlights: 1997."
(2) S.C. Department of Commerce, 2000/2001 "South Carolina Industrial Directory."
(3) S.C. Energy Office "2001 South Carolina Energy Use Profile.")

Total Reported Water Use

Total water use reported for 2001 was more than 11.8 trillion gallons (11,839,543.42 million gallons) from 931 reporting facilities. Surface water withdrawal from 468 facilities accounted for approximately 11.7 trillion gallons (11,763,474.75 million gallons), approximately 99.36%. Groundwater withdrawal from 483 reporting facilities accounted for approximately 76 billion gallons (76,068.63 million gallons) or approximately 0.64%.

Total Reported Water Use
By Source (in million gallons)

Surface Water	Groundwater	Total
11,763,474.75	76,068.67	11,839,543.42

Total Reported Water Use
By Category (in million gallons)

Water Use	Surface Water	Groundwater	Total
Hydroelectric	9,796,267.27	0.64	9,796,267.91
Thermoelectric	1,622,975.63	2,009.25	1,624,984.88
Water Supply	154,975.30	38,549.99	193,525.29
Industrial	168,698.78	11,881.12	180,579.90
Irrigation	10,707.64	16,413.50	27,121.14
Golf Course	9,039.34	4,263.20	13,302.54
Mining	109.50	2,582.25	2,691.75
Aquaculture	701.29	163.88	865.17
Other	0.00	204.84	204.84
Total	11,763,474.75	76,068.67	11,839,543.42

Water Use in Power Production

According to the 2001 Energy Use Profile, South Carolina has 9 power generating utility companies with 51 power plants containing 206 generators with a total rating capacity of 18,827.4 megawatts (2000). The type generators are as follows:

96- Hydraulic Turbine (conventional)
54- Gas Combustion Turbine
37- Steam Turbine (boiler)
16- Hydraulic Turbine (pump storage)
3- Internal Combustion (diesel)

The primary energy source for the generators is as follows:

112- Water
32- Diesel Fuel Oil
28- Coal
25- Natural Gas
7- Nuclear
2- Residual Fuel Oil

Hydroelectric Water Use

Hydroelectric facilities employ energy from flowing water to generate electricity. Hydroelectric facilities utilize *impoundments* (reservoirs), *diversion* (run-of river) *or pumped storage* (reversible turbines). Water use is typically non-consumptive flow-through, with temporary diversion from down stream users. Reported water use for 33 hydroelectric sources accounted for approximately 9.8 trillion gallons (9,796,267.91 million gallons), approximately 85.77% of reported water use for power production and 82.74% of total reported water use for the year.

Hydroelectric
(in million gallons)

County	Surface Water	Groundwater	Total Use
Abbeville	21,269.00	0.00	21,269.00
Anderson	94.8	0.00	94.8
Berkeley	1,183,325.20	0.64	1,183,325.84
Cherokee	233,120.00	0.00	233,120.00
Chester	861,004.00	0.00	861,004.00
Edgefield	842,951.00	0.00	842,951.00
Fairfield	2,100,346.50	0.00	2,100,346.50
Greenwood	161,102.00	0.00	161,102.00
Kershaw	467,607.00	0.00	467,607.00
Lancaster	389,952.00	0.00	389,952.00
Laurens	54.20	0.00	54.20
Lexington	113,001.20	0.00	113,001.20
Oconee	653,785.40	0.00	653,785.40
Pickens	1,861,522.67	0.00	1,861,522.67
Richland	318,991.90	0.00	318,991.90
Spartanburg	3,849.30	0.00	3,849.30
Union	214,535.10	0.00	214,535.10
York	369,756.00	0.00	369,756.00
Total	9,796,267.27	0.64	9,796,267.91

Thermoelectric Water Use

Thermoelectric facilities generate electricity by superheating water to steam then passing the steam under pressure to turbines. Boilers are fired by coal, nuclear power or residual fuel oil. Large volumes of cooling water are required to condense the steam to the liquid state. Reported water use for 18 thermoelectric sources accounted for more than 1.62 trillion gallons (1,624,984.88 million gallons), approximately 14.23% of reported water use for the year.

Thermoelectric
(in million gallons)

County	Surface Water	Groundwater	Total Use
Aiken	47,977.00	0.00	47,977.00
Anderson	20,092.00	0.00	20,092.00
Berkeley	191,699.31	4.92	191,704.23
Colleton	1,285.15	0.00	1,285.15
Darlington	3,079.40	432.84	3,512.24
Fairfield	190,091.18	0.00	190,091.18
Georgetown	4,933.56	0.00	4,933.56
Greenwood	47.10	0.00	47.10
Horry	39,164.28	0.00	39,164.28
Lexington	46,735.55	0.00	46,735.55
Oconee	883,016.00	0.00	883,016.00
Orangeburg	0.00	1,354.81	1,354.81
Richland	157,302.10	216.68	157,518.78
York	37,553.00	0.00	37,553.00
Total	1,622,975.63	2,009.25	1,624,984.88

Total Reported Water Use
(excluding power production)

During 2001, reported water use (excluding power production) totaled more than 418 billion gallons (418,290,630,000), with surface water withdrawal accounting for 344,231,850,000 gallons or approximately 82.29% and groundwater withdrawal accounting for 74,058,780,000 gallons or approximately 17.71%.

Total Reported Water Use
By Category
(excluding Power Generation)
(in million gallons)

Water Use	Surface Water	Groundwater	Total
Water Supply	154,975.30	38,549.99	193,525.29
Irrigation	10,707.64	16,413.50	27,121.14
Industrial	168,698.78	11,881.12	180,579.90
Golf Course	9,039.34	4,263.20	13,302.54
Mining	109.50	2,582.25	2,691.75
Aquaculture	701.29	163.88	865.17
Other	0.00	204.84	204.84
Total	344,231.85	74,058.78	418,290.63

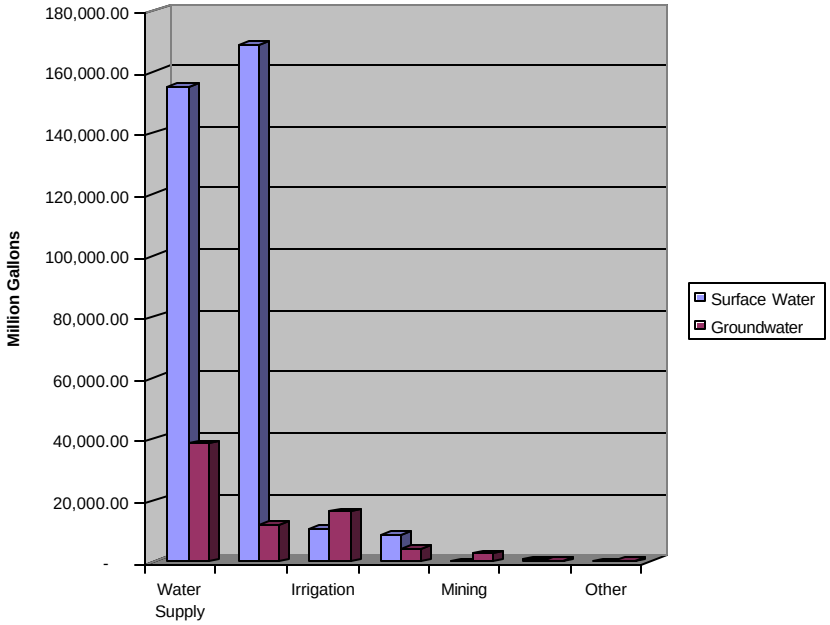

Chart 1

Water Supply

South Carolina has 1,551 defined public water systems, of which 685 are community water systems. The public water systems provide water to 3,450,928 citizens. Water withdrawal for public water supply from 158 reporting suppliers totaled 193,525,290,000 gallons, with 51 surface water systems accounting for 154,975,300,000 gallons and 114 groundwater systems accounting for 38,549,990,000 gallons.

Water Supply
By County
(in million gallons)

County	Surface Water	Groundwater	Total	Population Served
Abbeville	972.82	0.00	972.82	15,507
Aiken	2,142.50	5,037.95	7,180.45	128,257
Allendale	0.00	306.59	306.59	11,746
Anderson	7,729.36	0.00	7,729.36	175,341
Bamberg	0.00	503.13	503.13	10,617
Barnwell	0.00	979.05	979.05	14,172
Beaufort	8,226.20	4,170.76	12,396.96	131,863
Berkeley	0.00	16.79	16.79	61,597
Calhoun	0.00	157.01	157.01	6,510
Charleston	18,613.93	2,728.41	21,342.34	423,953
Cherokee	2,083.00	0.00	2,083.00	45,640
Chester	1,259.92	0.00	1,259.92	15,877
Chesterfield	1,482.26	0.00	1,482.26	30,693
Clarendon	0.00	559.76	559.76	16,459
Colleton	0.00	870.72	870.72	22,902
Darlington	0.00	2,662.10	2,662.10	54,935
Dillon	0.00	1,668.59	1,668.59	25,255
Dorchester	0.00	138.98	138.98	69,337
Edgefield	1,343.44	0.00	1,343.44	21,670
Fairfield	711.37	29.09	740.46	20,011
Florence	0.00	5,142.98	5,142.98	82,518
Georgetown	1,541.27	1,129.20	2,670.47	57,432
Greenville	25,716.55	0.00	25,716.55	368,165
Greenwood	5,050.95	0.00	5,050.95	50,077
Hampton	0.00	304.83	304.83	11,802
Horry	13,046.94	873.58	13,920.52	206,976
Jasper	0.00	538.22	538.22	12,072
Kershaw	1,537.45	974.77	2,512.22	56,821
Lancaster	4,710.98	0.00	4,710.98	67,235
Laurens	1,570.89	0.00	1,570.89	50,545
Lee	0.00	467.25	467.25	4,963
Lexington	1,677.51	303.94	1,981.45	111,445
Marion	0.00	1,511.44	1,511.44	27,222
Marlboro	811.48	543.20	1,354.68	21,574
McCormick	408.88	0.00	408.88	10,876
Newberry	2,220.22	13.77	2,233.99	24,709
Oconee	3,639.68	0.00	3,639.68	72,182
Orangeburg	2,971.63	483.30	3,454.93	63,475
Pickens	4,536.43	0.00	4,536.43	111,066
Richland	21,568.19	21.79	21,589.98	269,933
Saluda	0	0	0	7,379
Spartanburg	12,511.43	32.40	12,543.83	218,786
Sumter	0.00	5,725.65	5,725.65	84,193
Union	1,455.02	0.00	1,455.02	29,257
Williamsburg	0.00	550.24	550.24	15,711
York	5,435.00	104.50	5,539.50	112,172
Total	154,975.30	38,549.99	193,525.29	3,450,928

Water Supply Source Comparison

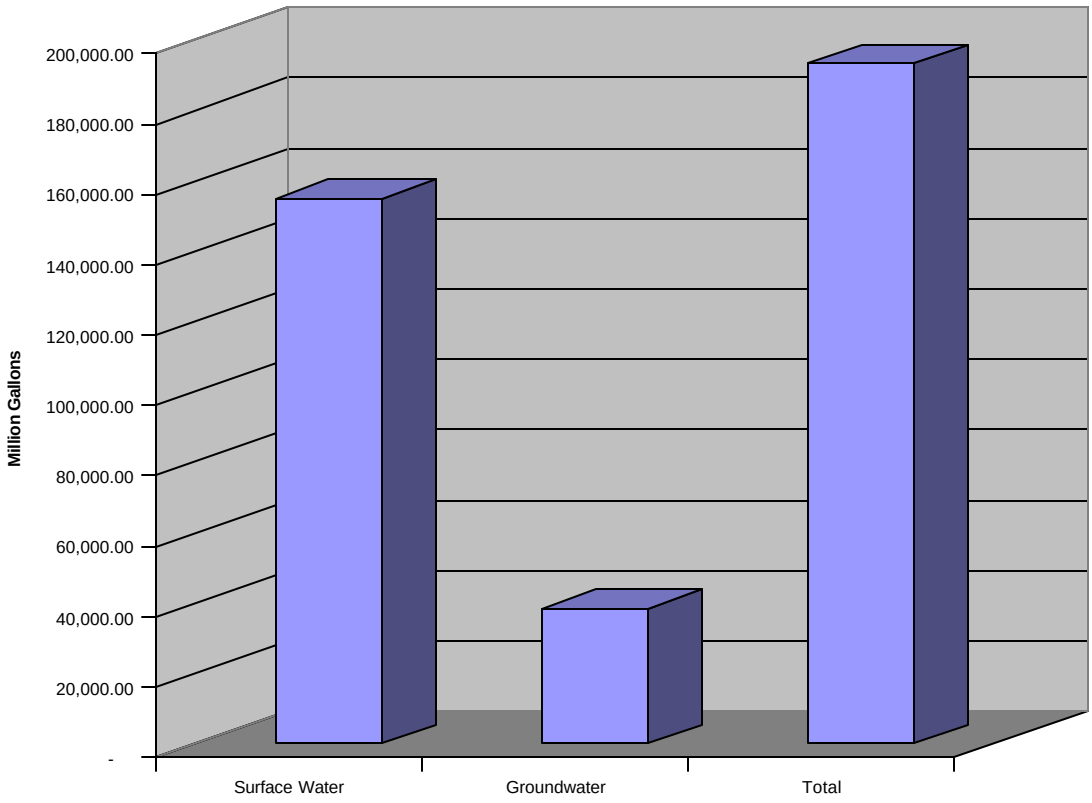

Chart 2

Industrial Use

Water withdrawal for industrial use from 99 reporting industries totaled 180,579,870,000 gallons, with 51 surface water systems accounting for 168,698,760,000 gallons and 64 groundwater systems accounting for 11,881,110,000 gallons. Water use at industrial facilities is predominantly cooling water (contact and non-contact) with return to surface water systems through permitted NPDES discharges.

Industrial Use
By County
(in million gallons)

County	Surface Water	Groundwater	Total
Abbeville	110.66	0.00	110.66
Aiken	40,884.09	2,112.72	42,996.81
Allendale	0.00	718.31	718.31
Anderson	59.57	0.00	59.57
Beaufort	0.00	135.95	135.95
Berkeley	3,298.10	791.93	4,090.03
Calhoun	31,654.63	173.8	31,828.43
Charleston	8,778.90	79.81	8,858.71
Cherokee	593.60	0.00	593.60
Chester	188.76	0.82	189.58
Darlington	4,174.44	1,294.45	5,468.89
Dorchester	178.70	787.56	966.26
Florence	10,451.80	721.03	11,172.83
Georgetown	11,537.23	54.36	11,591.59
Greenville	132.50	64.03	196.53
Greenwood	125.40	15.04	140.44
Hampton	0.00	418.82	418.82
Horry	0.00	104.5	104.50
Kershaw	33.21	401.59	434.80
Lancaster	2,469.00	0.00	2,469.00
Lexington	8,197.78	1,015.51	9,213.29
Marion	0.00	36.33	36.33
Marlboro	6,890.50	307.5	7,198.00
Oconee	720.69	0.00	720.69
Orangeburg	111.23	690.32	801.55
Pickens	2,968.12	0.00	2,968.12
Richland	10,935.18	632.05	11,567.23
Saluda	0.00	63.99	63.99
Spartanburg	0.00	2.52	2.52
Sumter	0.00	283.13	283.13
Union	956.49	9.55	966.04
Williamsburg	0.00	965.5	965.50
York	23,248.20	0.00	23,248.20
Total	168,698.78	11,881.12	180,579.90

Industrial Use Source Comparison

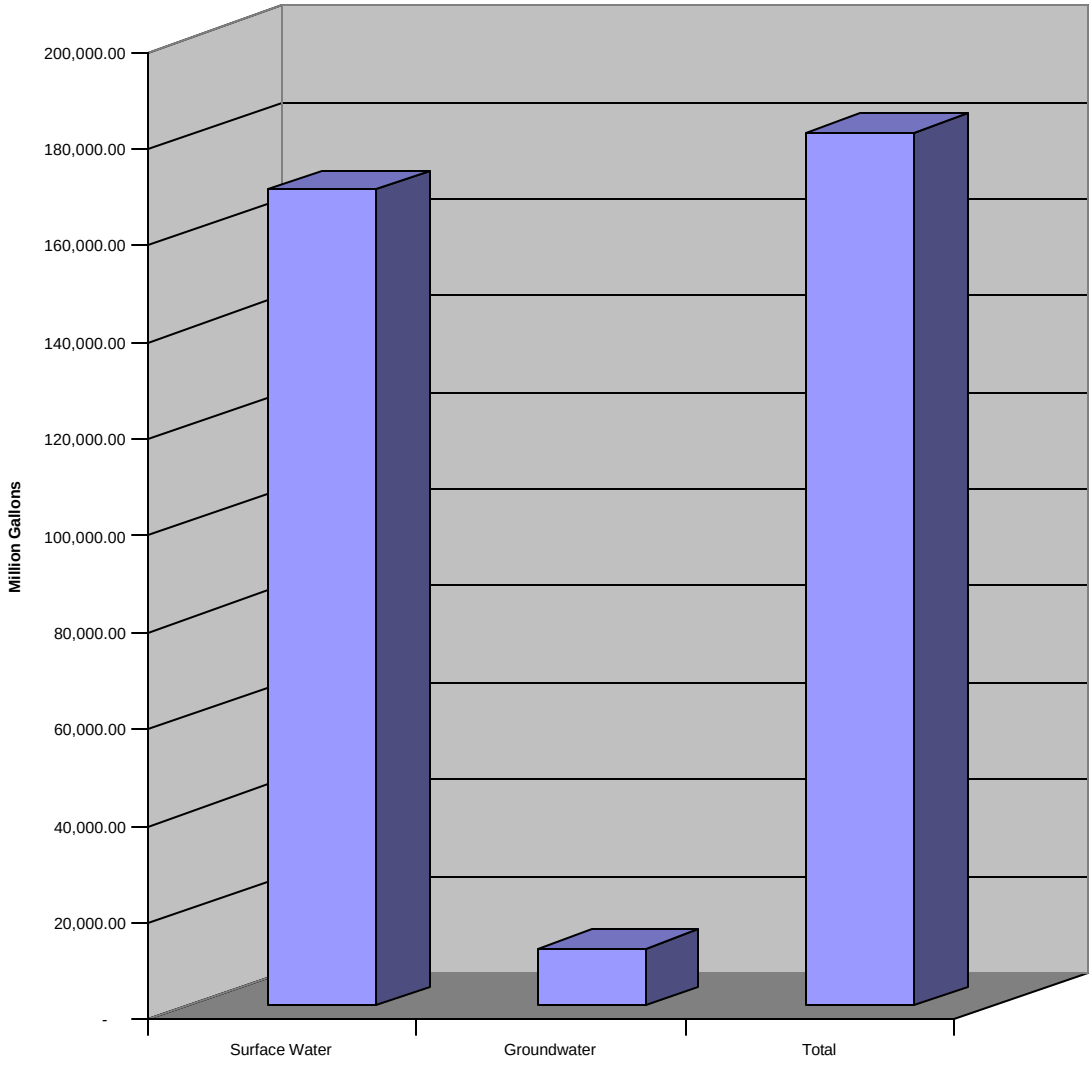

Chart 3

Irrigation Use

Water withdrawal for irrigation use from 203 reporting entities totaled 27,121,140,00 gallons, with 116 surface water systems accounting for 10,707,640,000 gallons and 128 groundwater systems accounting for 16,413,500,000 gallons.

Irrigation Use
By County
(in million gallons)

County	Surface Water	Groundwater	Total	Irrigated Acreage [1]
Aiken	0.00	207.00	207.00	1340
Allendale	720.00	3,708.32	4,428.32	9350
Bamberg	543.70	526.85	1,070.55	11,585
Barnwell	87.20	53.87	141.07	5075
Beaufort	33.78	734.06	767.84	1950
Berkeley	1,300.00	21.86	1,321.86	
Calhoun	838.45	1,559.23	2,397.68	12,175
Charleston	57.30	0.00	57.30	950
Chester	1.85	0.00	1.85	335
Chesterfield	0.00	225.50	225.50	900
Clarendon	154.00	465.72	619.72	7,525
Colleton	841.50	1,930.89	2,772.39	759
Darlington	236.02	29.00	265.02	2,525
Dillon	0.00	34.90	34.90	304
Edgefield	423.95	43.30	467.25	6,735
Florence	20.74	78.56	99.30	5,100
Georgetown	648.74	0.01	648.75	985
Greenville	88.26	0.00	88.26	102
Greenwood	0.00	1.20	1.20	27
Hampton	89.66	1,408.97	1,498.63	4,715
Horry	54.99	75.52	130.51	5,040
Jasper	0.00	373.20	373.20	1,795
Lee	9.00	36.00	45.00	3,515
Lexington	212.76	692.72	905.48	11,835
Marion	0.00	24.94	24.94	10,599
Marlboro	210.84	256.59	467.43	1,510
Newberry	134.80	37.92	172.72	489
Oconee	317.70	0.00	317.70	2
Orangeburg	1,496.73	2,708.47	4,205.20	29,490
Pickens	10.80	0.00	10.80	250
Richland	23.50	0.00	23.50	1,010
Saluda	944.86	0.00	944.86	4,450
Spartanburg	318.77	0.00	318.77	3,030
Sumter	868.74	1,163.40	2,032.14	10,135
Williamsburg	3.00	0.00	3.00	200
York	16.00	15.50	31.50	285
Total	10,707.64	16,413.50	27,121.14	161,069

(1) Clemson University, Cooperative Extension Service, “2000 South Carolina Irrigation Survey”

Irrigation Use Source Comparison

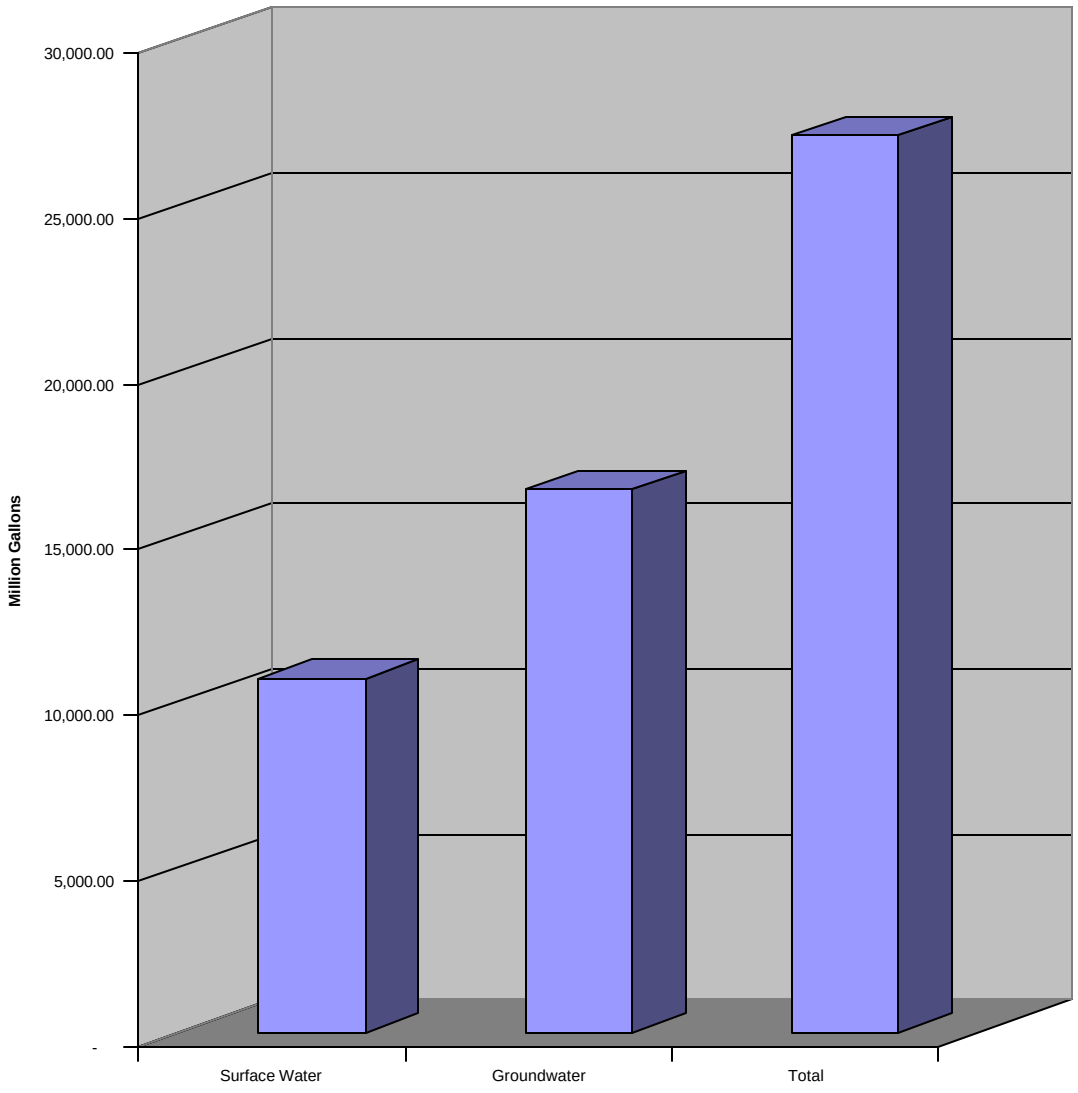

Chart 4

Golf Course Use

South Carolina has 337 public, private and semi-private golf courses. An average of 38,855 paid rounds of golf (per 18 hole course) were played during 2001, generating approximately 11.0 million dollars in admission taxes[1]. Water withdrawal from 249 reporting courses for golf course irrigation totaled 13,302,510,000 gallons, with surface water systems accounting for 9,039,340,000 gallons and groundwater systems accounting for 4,263,170,000 gallons.

Golf Course Irrigation
(in million gallons)

County	Surface Water	Groundwater	Total
Abbeville	0.00	0.28	0.28
Aiken	326.16	100.17	426.33
Allendale	17.40	0.00	17.40
Anderson	164.82	0.00	164.82
Barnwell	24.50	0.00	24.50
Beaufort	1,016.86	1,772.74	2,789.60
Berkeley	30.00	15.00	45.00
Calhoun	59.80	52.40	112.20
Charleston	263.68	511.61	775.29
Chester	3.80	39.20	43.00
Chesterfield	202.27	0.00	202.27
Clarendon	68.50	13.50	82.00
Colleton	0.00	1.00	1.00
Darlington	93.90	25.00	118.90
Dorchester	0.00	57.50	57.50
Edgefield	7.00	131.00	138.00
Florence	27.00	92.96	119.96
Georgetown	1,008.73	87.79	1,096.52
Greenville	454.23	28.57	482.80
Greenwood	105.67	12.88	118.55
Hampton	0.00	8.70	8.70
Horry	2,807.41	785.34	3,592.75
Kershaw	28.33	23.71	52.04
Lancaster	5.60	15.40	21.00
Laurens	118.41	0.00	118.41
Lexington	284.94	67.00	351.94
Marion	10.00	6.00	16.00
McCormick	38.09	0.00	38.09
Newberry	13.40	8.00	21.40
Oconee	127.64	0.00	127.64
Orangeburg	158.02	14.73	172.75
Pickens	507.03	0.00	507.03
Richland	408.91	76.76	485.67
Saluda	10.46	0.00	10.46
Spartanburg	271.31	3.42	274.73
Sumter	196.60	270.79	467.39
Union	7.00	0.00	7.00
York	171.87	41.75	213.62
Total	9,039.34	4,263.20	13,302.54

(1) South Carolina Department of Parks, Recreation and Tourism, "2000/2001 Economic Impact of Golf in South Carolina."

Golf Course Source Comparison

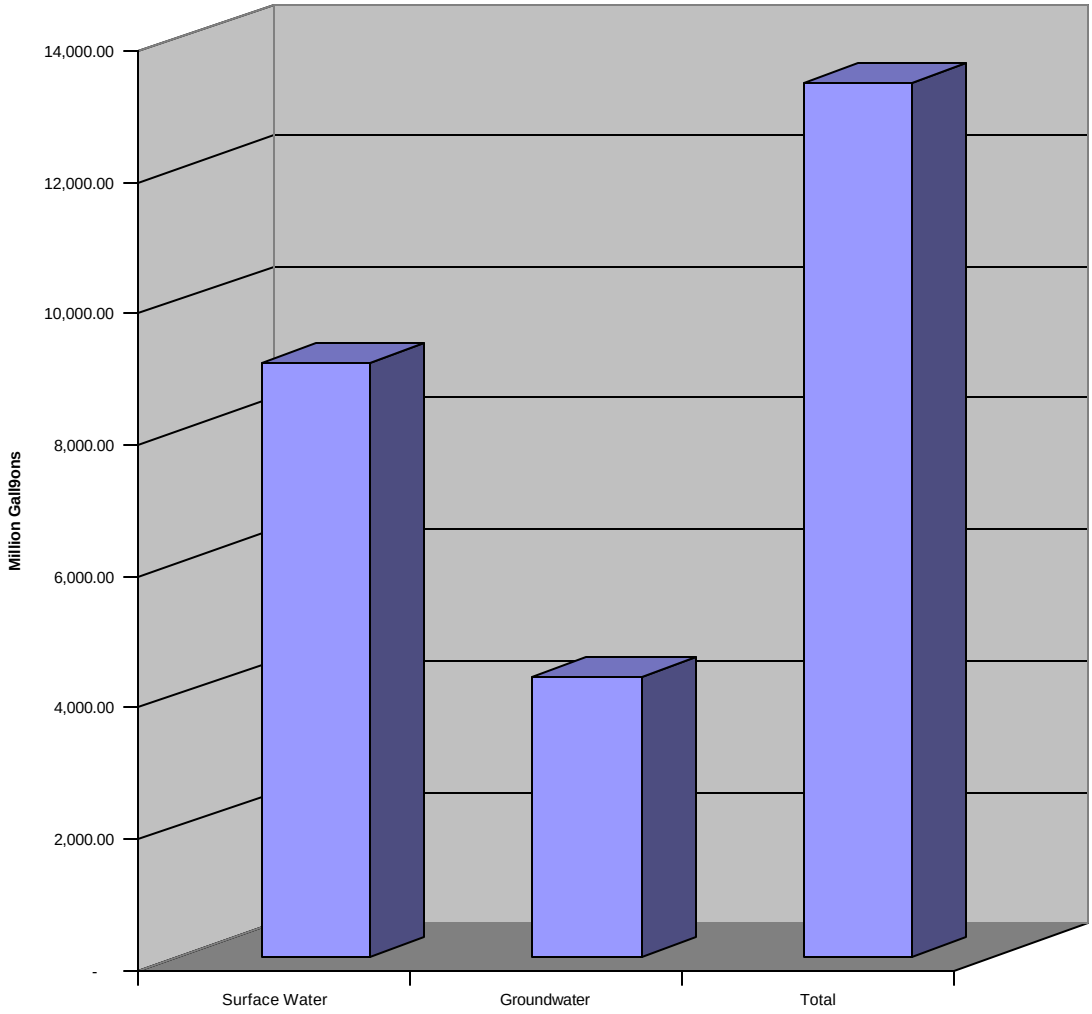

Chart 5

Mining Use

Water withdrawal associated with mining activities at 8 reporting facilities totaled 2,691,750,000 gallons, with 1 surface water system accounting for 109,500,000 gallons and 8 groundwater systemsl accounting for 2,582,250,000 gallons.

Mining Activity (in million gallons)

County	Surface Water	Groundwater	Total
Aiken	0.00	40.26	40.26
Chesterfield	0.00	44.76	44.76
Lexington	109.50	551.79	661.29
Orangeburg	0.00	1,758.21	1,758.21
Richland	0.00	182.94	182.94
York	0.00	4.29	4.29
Total	109.50	2,582.25	2,691.75

Aquaculture Use

Water withdrawal from 11 reporting aquaculture farming facilities totaled 865,170,000 gallons, with 8 surface water systems accounting for 701,290,000 gallons and 7 groundwater systems accounting for 163,880,000 gallons.

Aquaculture (in million gallons)

County	Surface Water	Groundwater	Total
Beaufort	76.21	11.60	87.81
Berkeley	72.98	16.08	89.06
Charleston	439.20	0.00	439.20
Dillon	0.00	46.9	46.90
Hampton	0.00	72.30	72.30
Jasper	0.00	7.00	7.00
Richland	81.80	10.00	91.80
Spartanburg	31.10	0.00	31.10
Total	701.29	163.88	865.17

Other Use

Water withdrawal for other, non-specific use from 3 reporting facilities totaled 204,840,000 gallons, with groundwater accounting for all reported use.

Other Use (in million gallons)

County	Surface Water	Groundwater	Total
Beaufort	0.00	117.50	117.50
Horry	0.00	71.34	71.34
Jasper	0.00	16.00	16.00
Total	0.00	204.84	204.84

Mining Use Source Comparison

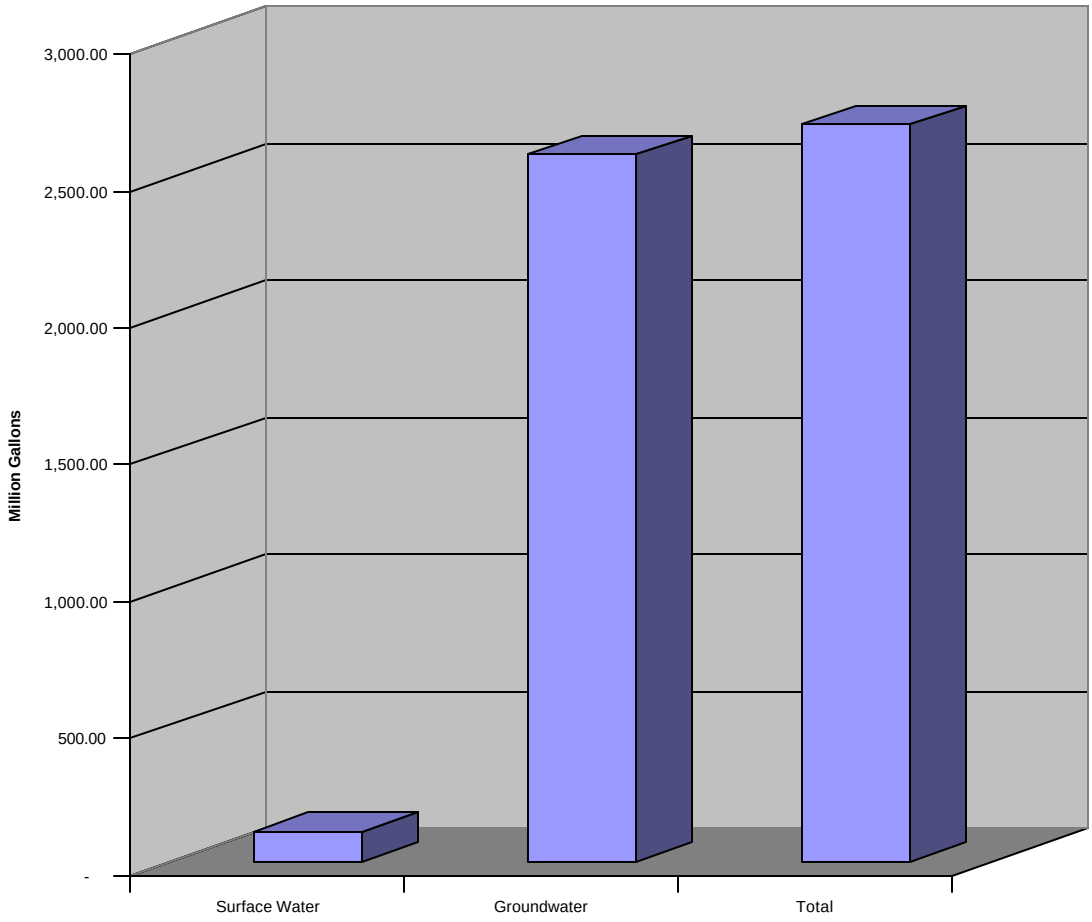

Chart 6

Aquaculture Source Comparison

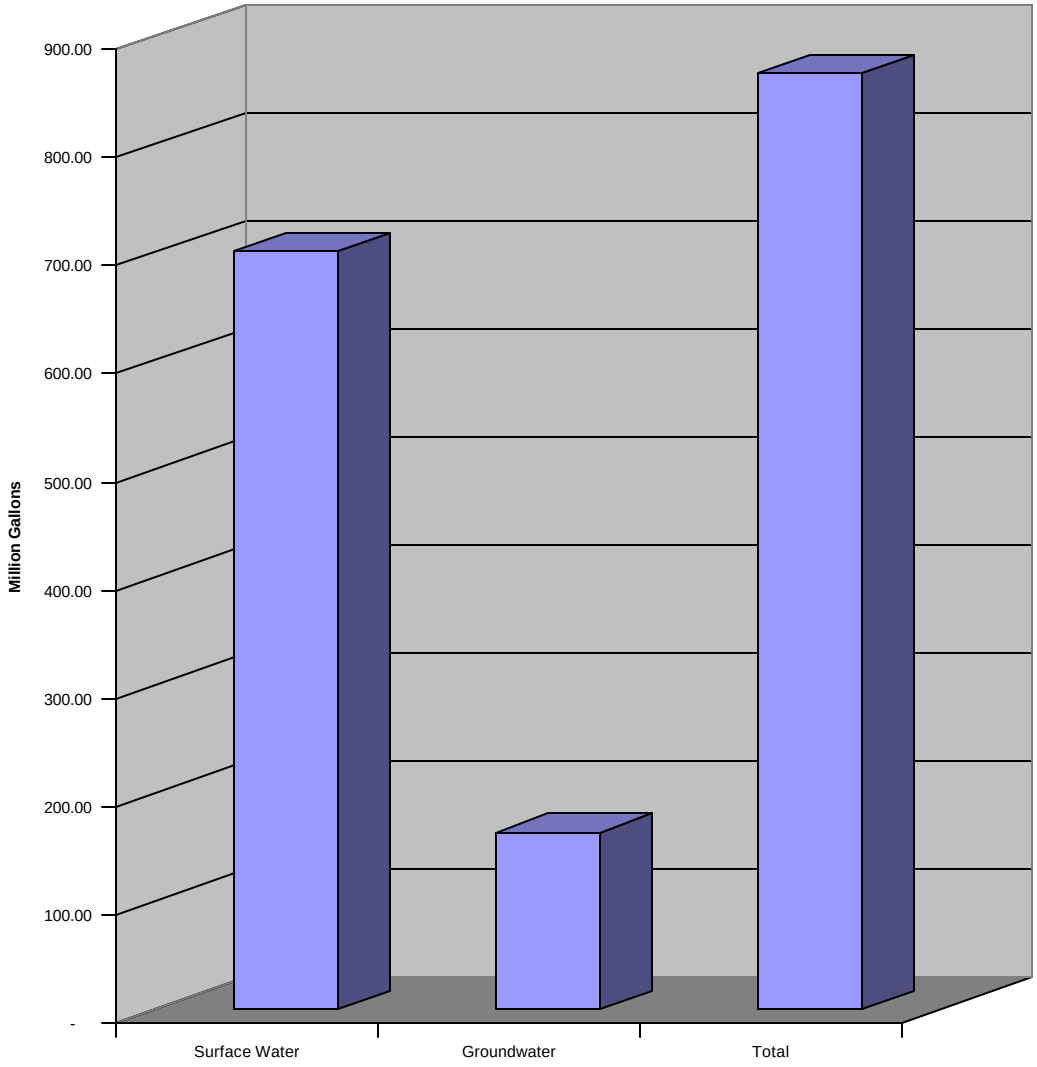

Chart 7

Other Use Source Comparison

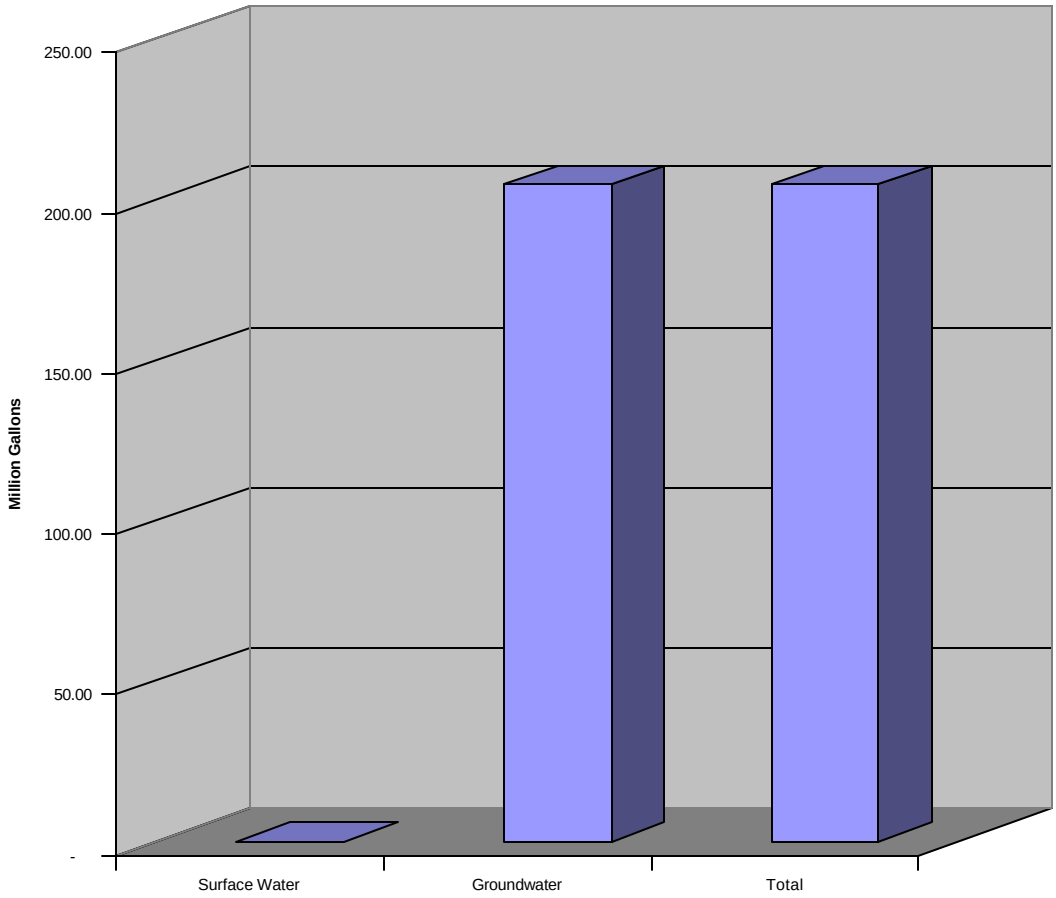

Chart 8

2001 Surface Water Use by County
(in million gallons)

County	Hydro-electric	Thermo-electric	Water Supply	Industrial	Irrigation	Golf Course	Mining	Aqua-culture	Other
Abbeville	21,269.00	0.00	972.82	110.66	0.00	0.00	0.00	0.00	0.00
Aiken	0.00	47,977.00	2,142.50	40,884.09	0.00	326.16	0.00	0.00	0.00
Allendale	0.00	0.00	0.00	0.00	720.00	17.40	0.00	0.00	0.00
Anderson	94.8	20,092.00	7,729.36	59.57	0.00	164.82	0.00	0.00	0.00
Bamberg	0.00	0.00	0.00	0.00	543.70	0.00	0.00	0.00	0.00
Barnwell	0.00	0.00	0.00	0.00	87.20	24.50	0.00	0.00	0.00
Beaufort	0.00	0.00	8,226.20	0.00	33.78	1,016.86	0.00	76.21	0.00
Berkeley	1,183,325.20	191,699.31	0.00	3,298.10	1,300.00	30.00	0.00	72.98	0.00
Calhoun	0.00	0.00	0.00	31,654.63	838.45	59.80	0.00	0.00	0.00
Charleston	0.00	0.00	18,613.93	8,778.90	57.30	263.68	0.00	439.20	0.00
Cherokee	233,120.00	0.00	2,083.00	593.60	0.00	0.00	0.00	0.00	0.00
Chester	861,004.00	0.00	1,259.92	188.76	1.85	3.80	0.00	0.00	0.00
Chesterfield	0.00	0.00	1,482.26	0.00	0.00	202.27	0.00	0.00	0.00
Clarendon	0.00	0.00	0.00	0.00	154.00	68.50	0.00	0.00	0.00
Colleton	0.00	1,285.15	0.00	0.00	841.50	0.00	0.00	0.00	0.00
Darlington	0.00	3,079.40	0.00	4,174.44	236.02	93.90	0.00	0.00	0.00
Dillon	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Dorchester	0.00	0.00	0.00	178.70	0.00	0.00	0.00	0.00	0.00
Edgefield	842,951.00	0.00	1,343.44	0.00	423.95	7.00	0.00	0.00	0.00
Fairfield	2,100,346.50	190,091.18	711.37	0.00	0.00	0.00	0.00	0.00	0.00
Florence	0.00	0.00	0.00	10,451.80	20.74	27.00	0.00	0.00	0.00
Georgetown	0.00	4,933.56	1,541.27	11,537.23	648.74	1,008.73	0.00	0.00	0.00
Greenville	0.00	0.00	25,716.55	132.50	88.26	454.23	0.00	0.00	0.00
Greenwood	161,102.00	47.10	5,050.95	125.40	0.00	105.67	0.00	0.00	0.00
Hampton	0.00	0.00	0.00	0.00	89.66	0.00	0.00	0.00	0.00
Horry	0.00	39,164.28	13,046.94	0.00	54.99	2,807.41	0.00	0.00	0.00
Jasper	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Kershaw	467,607.00	0.00	1,537.45	33.21	0.00	28.33	0.00	0.00	0.00
Lancaster	389,952.00	0.00	4,710.98	2,469.00	0.00	5.60	0.00	0.00	0.00
Laurens	54.20	0.00	1,570.89	0.00	0.00	118.41	0.00	0.00	0.00
Lee	0.00	0.00	0.00	0.00	9.00	0.00	0.00	0.00	0.00
Lexington	113,001.20	46,735.55	1,677.51	8,197.78	212.76	284.94	109.50	0.00	0.00
Marion	687,144.16	0.00	0.00	0.00	0.00	10.00	0.00	0.00	0.00
Marlboro	0.00	0.00	811.48	6,890.50	210.84	0.00	0.00	0.00	0.00
McCormick	0.00	0.00	408.88	0.00	0.00	38.09	0.00	0.00	0.00
Newberry	0.00	0.00	2,220.22	0.00	134.80	13.40	0.00	0.00	0.00
Oconee	653,785.40	883,016.00	3,639.68	720.69	317.70	127.64	0.00	0.00	0.00
Orangeburg	0.00	0.00	2,971.63	111.23	1,496.73	158.02	0.00	0.00	0.00
Pickens	1,861,522.67	0.00	4,536.43	2,968.12	10.80	507.03	0.00	0.00	0.00
Richland	318,991.90	157,302.10	21,568.19	10,935.18	23.50	408.91	0.00	81.80	0.00
Saluda	0.00	0.00	0.00	0.00	944.86	10.46	0.00	0.00	0.00
Spartanburg	3,849.30	0.00	12,511.43	0.00	318.77	271.31	0.00	31.10	0.00
Sumter	0.00	0.00	0.00	0.00	868.74	196.60	0.00	0.00	0.00
Union	214,535.10	0.00	1,455.02	956.49	0.00	7.00	0.00	0.00	0.00
Williamsburg	0.00	0.00	0.00	0.00	3.00	0.00	0.00	0.00	0.00
York	369,756.00	37,553.00	5,435.00	23,248.20	16.00	171.87	0.00	0.00	0.00
Total 2001	9,796,267.27	1,622,975.63	154,975.30	168,698.78	10,707.64	9,039.34	109.50	701.29	0.00
Total 2000	10,281,681.33	2,238,382.15	115,340.83	145,761.53	1,797.65	4,625.47	438.63	0.00	0.00

Table 1

2001 Groundwater Use by County
(in million gallons)

County	Hydro-electric	Thermo-electric	Water Supply	Industrial	Irrigation	Golf Course	Mining	Aqua-culture	Other
Abbeville	0.00	0.00	0.00	0.00	0.00	0.28	0.00	0.00	0.00
Aiken	0.00	0.00	5,037.95	2,112.72	207.00	100.17	40.26	0.00	0.00
Allendale	0.00	0.00	306.59	718.31	3,708.32	0.00	0.00	0.00	0.00
Anderson	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Bamberg	0.00	0.00	503.13	0.00	526.85	0.00	0.00	0.00	0.00
Barnwell	0.00	0.00	979.05	0.00	53.87	0.00	0.00	0.00	0.00
Beaufort	0.00	0.00	4,170.76	135.95	734.06	1,772.74	0.00	11.60	117.50
Berkeley	0.64	4.92	16.79	791.93	21.86	15.00	0.00	16.08	0.00
Calhoun	0.00	0.00	157.01	173.80	1,559.23	52.40	0.00	0.00	0.00
Charleston	0.00	0.00	2,728.41	79.81	0.00	511.61	0.00	0.00	0.00
Cherokee	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Chester	0.00	0.00	0.00	0.82	0.00	39.20	0.00	0.00	0.00
Chesterfield	0.00	0.00	77.19	0.00	225.50	0.00	44.76	0.00	0.00
Clarendon	0.00	0.00	559.76	0.00	465.72	13.50	0.00	0.00	0.00
Colleton	0.00	0.00	870.72	0.00	1,930.89	1.00	0.00	0.00	0.00
Darlington	0.00	432.84	2,662.10	1,294.45	29.00	25.00	0.00	0.00	0.00
Dillon	0.00	0.00	1,668.59	0.00	34.90	0.00	0.00	46.90	0.00
Dorchester	0.00	0.00	138.98	787.56	0.00	57.50	0.00	0.00	0.00
Edgefield	0.00	0.00	0.00	0.00	43.30	131.00	0.00	0.00	0.00
Fairfield	0.00	0.00	29.09	0.00	0.00	0.00	13.84	0.00	0.00
Florence	0.00	0.00	5,142.98	721.03	43.30	92.96	0.00	0.00	0.00
Georgetown	0.00	0.00	1,129.20	54.36	0.01	87.79	0.00	0.00	0.00
Greenville	0.00	0.00	0.00	64.03	0.00	28.57	0.00	0.00	0.00
Greenwood	0.00	0.00	0.00	15.04	1.20	12.88	0.00	0.00	0.00
Hampton	0.00	0.00	304.83	418.82	1,408.97	8.70	0.00	72.30	0.00
Horry	0.00	0.00	873.58	104.50	75.52	785.34	0.00	0.00	71.34
Jasper	0.00	0.00	538.22	0.00	373.20	0.00	0.00	7.00	16.00
Kershaw	0.00	0.00	974.77	401.59	0.00	23.71	0.00	0.00	0.00
Lancaster	0.00	0.00	0.00	0.00	0.00	15.40	0.00	0.00	0.00
Laurens	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Lee	0.00	0.00	467.25	0.00	36.00	0.00	0.00	0.00	0.00
Lexington	0.00	0.00	303.94	1,015.51	692.72	67.00	551.79	0.00	0.00
Marion	0.00	0.00	1,511.44	36.33	24.94	6.00	0.00	0.00	0.00
Marlboro	0.00	0.00	543.20	307.50	256.59	0.00	0.00	0.00	0.00
McCormick	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Newberry	0.00	0.00	13.77	0.00	37.92	8.00	0.00	0.00	0.00
Oconee	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Orangeburg	0.00	1,354.81	483.30	690.32	2,708.47	14.73	1,758.21	0.00	0.00
Pickens	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Richland	0.00	216.68	21.79	632.05	0.00	76.76	182.94	10.00	0.00
Saluda	0.00	0.00	0.00	63.99	0.00	0.00	0.00	0.00	0.00
Spartanburg	0.00	0.00	32.40	2.52	0.00	3.42	0.00	0.00	0.00
Sumter	0.00	0.00	5,725.65	283.13	1,163.40	270.79	0.00	0.00	0.00
Union	0.00	0.00	0.00	9.55	0.00	0.00	0.00	0.00	0.00
Williamsburg	0.00	0.00	550.24	965.50	0.00	0.00	0.00	0.00	0.00
York	0.00	0.00	104.50	0.00	15.50	41.75	4.29	0.00	0.00
Total 2001	0.64	2,009.25	38,549.99	11,881.12	16,413.50	4,263.20	2,582.25	163.88	204.84
Total 2000	0.58	2,126.22	32,924.38	11,701.80	1,385.08	2,180.88	2,617.45	13.67	223.61

Table 2